

CLAIMS

1. Electrolyte matrix, especially for a molten carbonate fuel cell, which consists of a matrix material, which, in the green state, contains one or more lithium compounds, aluminum oxide, and a carbide, characterized by the fact that the matrix material contains a combination of lithium carbonate, aluminum oxide, and titanium carbide in the green state.

2. Electrolyte matrix in accordance with Claim 1, characterized by the fact that the matrix material additionally contains aluminum hydroxide.

3. Electrolyte matrix in accordance with Claim 1 or Claim 2, characterized by the fact that the matrix material additionally contains nanoscale secondary particles.

4. Electrolyte matrix in accordance with Claim 3, characterized by the fact that the matrix material contains one or more of ZrO_2 , SiO_2 , Al_2O_3 , and TiO_2 as the nanoscale secondary particles.

5. Electrolyte matrix in accordance with any of Claims 1 to 4, characterized by the fact that when the fuel cell is started up, the matrix material undergoes synthesis, accompanied by an increase in volume, and contains lithium aluminate and lithium titanate after the start-up.

6. Electrolyte matrix in accordance with Claim 5, characterized by the fact that after the start-up of the fuel cell, the electrolyte matrix has an open porosity of 30-70%, and preferably 50-70%.

7. Electrolyte matrix in accordance with Claim 5 or Claim 6, characterized by the fact that the volume increase at which the matrix material undergoes synthesis during the start-up of the fuel cell is 2.5-5%, and preferably 3-4%.

8. Method for producing an electrolyte matrix, especially for a molten carbonate fuel cell, in which the electrolyte matrix is produced from a matrix material that contains a combination of lithium carbonate, aluminum oxide, and titanium carbide.

9. Method in accordance with Claim 8, characterized by the fact that the matrix material additionally contains aluminum hydroxide.

10. Method in accordance with Claim 8 or Claim 9, characterized by the fact that the matrix material additionally contains nanoscale secondary particles.

11. Method in accordance with Claim 10, characterized by the fact that the matrix material contains one or more of ZrO_2 , SiO_2 , Al_2O_3 , and TiO_2 as the nanoscale secondary particles.

12. Method in accordance with any of Claims 8 to 11, characterized by the fact that the matrix material in finely powdered form is mixed with a dispersion medium/solvent to form a matrix slurry, which is then shaped and dried.

13. Method in accordance with Claim 12, characterized by the fact that the solids content of the matrix slurry is 50-80%, and preferably 60-70%.

14. Method in accordance with Claim 12 or Claim 13, characterized by the fact that the matrix slurry is shaped by casting, spraying, rolling, or application by doctor blade.

15. Method in accordance with any of Claims 8 to 14, characterized by the fact that the electrolyte matrix is incorporated in the fuel cell in the “green” state and undergoes synthesis during the start-up of the fuel cell.

16. Method in accordance with Claim 15, characterized by the fact that the matrix material undergoes synthesis during the start-up of the fuel cell with the formation of lithium aluminate and lithium titanate.

17. Method in accordance with Claim 15 or Claim 16, characterized by the fact that the synthesis of the electrolyte matrix is accompanied by an increase in volume.